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Desmodium densum (Leguminosae) in Taiwan

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Desmodium densum (C. Chen & X.J. Cui) H. Ohashi, known in Yunnan and Kwangsi (=Guangxi) in southwestern China, was newly found in northern Taiwan. For distinguishing it from the related taxa in Taiwan, a new key is presented. A detailed description and a line drawing of *D. densum* are provided. Taxonomic position of the species is considered to be intermediate between *D. podocarpum* and *D. laxum*, although it was regarded as close to *Podocarpium fallax* (=*D. podocarpum* subsp. *fallax*) or *D. podocarpum*.

Introduction

Desmodium densum (C. Chen & X.J. Cui) H. Ohashi, previously proposed as *Podocarpium fallax* var. *densum* C. Chen & X.J. Cui (Cui et al. 1987), is distributed in Yunnan and Kwangsi (=Guangxi) in southwestern China (Ohashi 1995a). Recently, some specimens collected from northern Taiwan was identified as this species. This is a new record to the flora of Taiwan and adds an example of close floristic relationships between Taiwan and southwestern China. A detailed description of *D. densum* based on specimens of Taiwan is given below because the original publication of this taxon is accompanied with a simple diagnosis as "a var. *fallaci* recedit, caulis foliisque dense albo-strigosis" (Cui et al. 1987), and especially, no flower characters of this species were previously described. A key is thus given to distinguish *D. densum* from its related species belonging to the subgenus Podocarpium in Taiwan. A line drawing of *D. densum* are provided here for the first time. The relationship of the species is also discussed.

Taxonomic treatments

Key to the taxa of subgenus Podocarpium of *Desmodium* in Taiwan

1. Leaves deciduous; leaflets with principal lateral veins reaching the margin; fruit-stipes usually less than 7(–10) mm long 2
    2. Stem densely villose; stipules triangular 4–6 mm long, 2–2.5 mm broad; inflorescences terminal, simple or branched at the first and/or second node .... *D. densum*
    2. Stem sparsely to densely pubescent; stipules subulate to narrowly triangular 5–10 mm long, 0.5–1 mm broad; inflorescences terminal and axillary, branched at several basal nodes .... 3 *D. podocarpum*
        3. Terminal leaflets orbicular, rounded to acute at apex; fruit-stipes 4–5 mm long .... subsp. *podocarpum*
        3. Terminal leaflets narrowly ovate to rhomboid, acuminate at apex; fruit-stipes 2–3 mm long.. .... subsp. *oxyphyllum*
1. Leaves persistent; leaflets with principal lateral

veins usually forming loops within the margin; fruit-stipes usually more than 10 mm long .... 4 *D. laxum*

4. Terminal leaflets ovate to broadly ovate, acuminate at apex, with white spots beneath; articles asymmetrically triangular .... subsp. *leptopus*
4. Terminal leaflets lanceolate to ovate, acute at apex, without white spots beneath; articles semiobovate .... subsp. *laterale*

Desmodium densum (C. Chen & X.J. Cui) H. Ohashi in J. Jpn. Bot. **70**: 142 (1995). [Fig. 1]

Podocarpium fallax (Schindl.) C. Chen & X.J. Cui var. *densum* C. Chen & X.J. Cui in Acta Bot. Yunn. **9**: 306 (1987).

An erect herb. Stems densely villose and hooked hairy. Stipules deciduous, triangular, 4–6 mm long, 2–2.5 mm broad, acuminate at apex. Leaves 3-foliolate, petiolate, densely villose and hooked hairy, deciduous; petioles pulvinate at base, 5.5–10 cm long, rachis 1.2–1.5 cm long; stipels subulate, 3 mm long; terminal leaflets ovate, 7.5–9.5 cm long, 4.9–6.2 cm broad, rounded at base, acuminate at apex, principal lateral veins reaching the margin; lateral leaflets similar to terminal one, oblique, rounded or truncate at base, acute or obtuse at apex. Inflorescences terminal and/or as a reproductive branch rising from the base of main stem, villose and hooked hairy, terminal one simple or branched at first and/or second nodes, pseudoracemose, 1–3-flowered at each node; bracts ovate, striate, 3 mm long, 1 mm broad, pubescent. Calyx campanulate, hooked hairy, 2 mm long, 5-lobed, upper two lobes connate nearly to the top, lower lobes with sparsely long straight hairs outside. Corolla white with pink spots; standard orbicular, clawed, 7 mm long, 7 mm broad, with 2 pink spots at base of lamina, emarginate at apex, claw 2 mm long; wing petals oblong, clawed, 6.8 mm long, 2 mm broad, with pink spots at apex, with carved line along the lower portion, claw 1.5 mm long; keel-petals oblong, clawed, 5.8 mm long, 2 mm broad, with pink spots at apex, claw 1.8 mm long, slightly adherent to wing petals; stamens monadelphous; pistil stipitate; ovary linear, gland-dotted; style glabrous, perpendicular to ovary; stigma terminal, disk-like. Pods deeply constricted, 2–3-jointed; fruit-stipes 5–6 mm long, slightly longer than its persisting pedicel; articles obliquely narrow-obtriangular, 7–10 mm long, 4 mm broad.

Distribution: Southwestern China (Yunnan and Kwangsi) and Taiwan. In Taiwan, in the shaded and wet forest floor of northern part about 500m in elevation associated with *Elatostema platyphylloides* Shih & Yang and *Begonia formosana* (Hayata) Masamune.

Specimens examined: Taiwan. Taipei Co.: Sanhsia, Hsiungkung, Yunshen Water Fall, K.C. Yang s.n. Oct. 16, 1994 (TAI, TUS), S.F. Huang 5381 (TAI, TUS).

Relationships of *Desmodium densum*

Desmodium densum is belonging to the subsection Podocarpium, which is composed of two Asian species, *D. podocarpum* and *D. laxum*, and three North American species, within the section Podocarpium included in the subgenus Podocarpium (Ohashi 1973). The subgenus comprises 13 species by adding the present one.

Desmodium densum is unique in having dense villose hairs and short hooked hairs on stems and leaves. It was regarded by Cui et al. (1987) to be most close to *Podocarpium fallax* (=*Desmodium podocarpium* subsp. *fallax*) or by Ohashi (1995a) to *D. podocarpum*, because the leaves are deciduous and the venation pattern of the first lateral nerves of leaflets and distribution pattern of leaves on stem show common features in these species. The first lateral nerves reach to the margin of leaflets in *D. densum* and *D. podocarpum*, although such a pattern found in some specimens of *D. laxum*. Deciduous nature of leaves may be found in *D. laxum* subsp. *falfolium* and subsp. *lateraxum*, although it is not

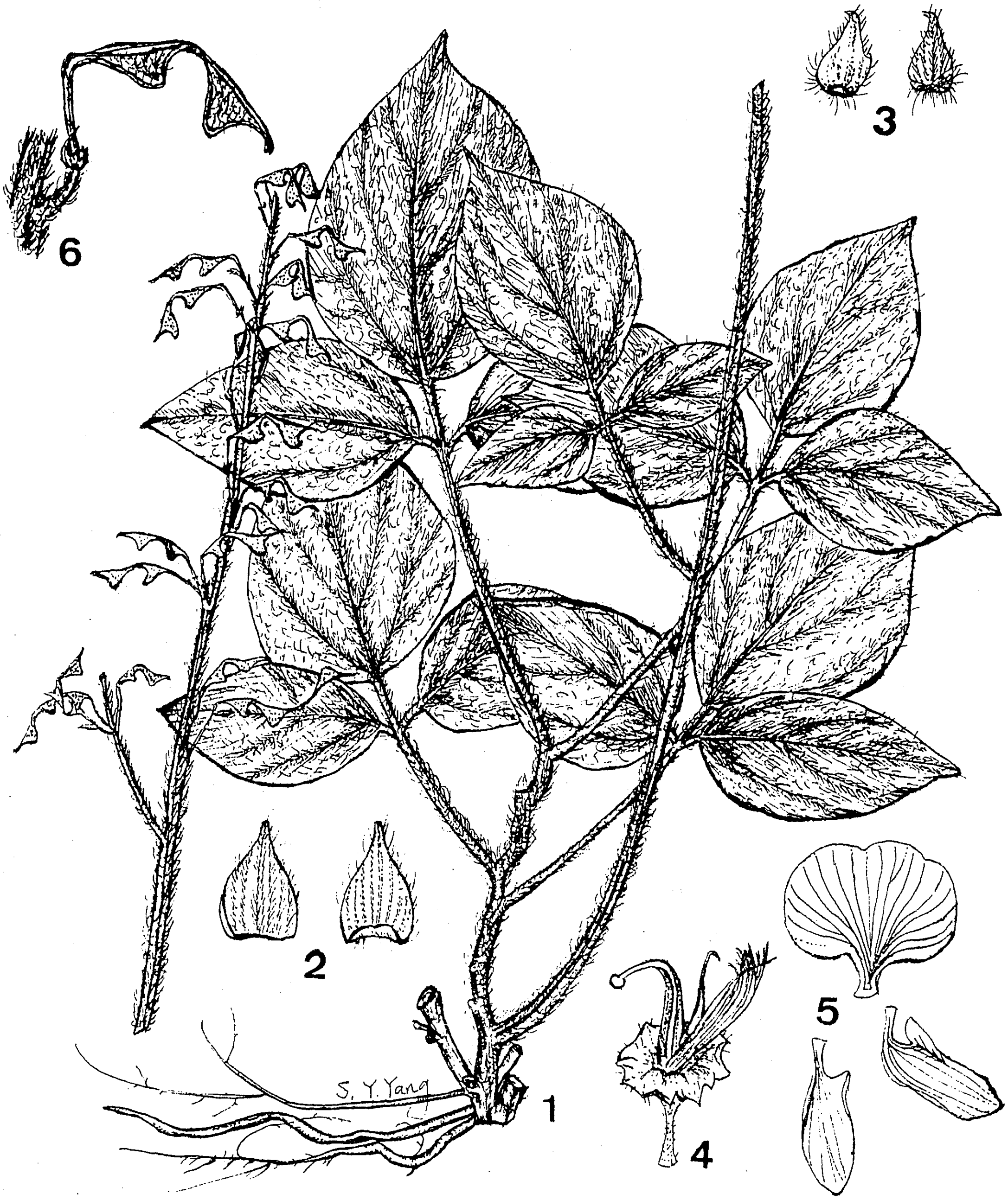

Fig. 1. *Desmodium densum* (C. Chen & X.J. Cui) H. Ohashi (voucher specimen: 1 and 6: K.C. Yang s.n. TAI; 2–5: S.F. Huang 5381 TAI). 1. habit, with a reproductive shoot with fruits × 0.5; 2. stipules × 4; 3. bracts × 4; 4. flower with petals removed × 5; 5. petals (st: standard, w: wing, k: keel) × 3; 7. pod × 2.

confirmed in both subspecies (Ohashi 1995b). Ohashi (1995a) pointed out the similarity between *D. densum* and *D. laxum* in articles of pods and branching pattern of reproductive shoots. In *D. densum* the reproductive shoot sometimes develops from the base of the main stem and this feature is found also in *D. laxum* and *D.*

Table 1. Main characters of *Desmodium laxum, D. podocarpium* and *D. densum*

Characters	*Desmodium laxum*	*D. podocarpium*	*D. densum*
Hairiness on lower stem	sparsely pubescent	sparsely pubescent	densely villose
Stipules	triangular to ovate	subulate to narrow-triangular	triangular
Leaves	persistent, probably deciduous in ssp. *falfolium* and ssp. *lateraxum* in China; clustered or scattered on stem	deciduous; clustered or scattered on stem	deciduous; clustered on stem
First lateral nerves of leaflets	looped within margin except some specimens of ssp. *laxum*	directly reaching margin	directly reaching margin
Inflorescences	terminal and axillary, and sometimes with a reproductive shoot rising from plant base	terminal and axillary	terminal on main stem and/or a reproductive shoot rising from plant base
Pedicels of fruits	5–20 mm long	4–9 mm long	4–5 mm long
Calyx	1.3–2.5 mm long	1.2–1.8 mm long	2 mm long
Standard	4.5–7.5 mm × 4–6.5 mm	2.5–4.5 mm × 2–4 mm	7 mm × 7 mm
Wings	5–7.5 mm × 1.2–2 mm	3–5 mm × 1–1.5 mm	6.8 mm × 2 mm
Keel-petals	5–7.5 mm × 1.2–2 mm	3–4 mm × 1.5 mm	5.8 mm × 2 mm
Fruit-stipes	(2–)12–20 mm long	1–7(–10) mm long	5–6 mm long
Pods	2–4 joints	(1–)2–3 joints	2–3 joints
Abaxial suture of article	distinctly S-shaped to apex except ssp. *leptopus*	obscure	distinct as ssp. *laxum*

nudiflorum, a native species of North America. Moreover, it becomes clear that *D. densum* is more similar to *D. laxum* than to *D. podocarpum* in flowers (Fig. 1, Tab. 1). Morphological comparison among these three related species is summarized in Table 1. Based on these facts we placed *D. densum* intermediate between *D. laxum* and *D. podocarpum*.,

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黄　星凡，楊　国禎，大橋広好：**台湾新産の *Desmodium densum*（マメ科）**

本紙70巻3号で大橋が発表した *Desmodium densum*（C. Chen & X. J. Cui）H. Ohashi，中国名密毛長柄山馬蝗（Cui et al. 1987），は1987年にケヤブハギの変種として記載された植物で，雲南省と広西省とに分布していると考えられていたが，1994年に台湾北部の三峡から新たに発見された．そこで，本論文では，従来簡単な区別点だけが記述されていただけであったので，台湾産の生品と標本に基づき，本種を記載し，図示した．また，近縁種と比較し，これまで本種がケヤブハギあるいは広義のヌスビトハギ *D. podocarpum* に近いとされていた点を，托葉，花序，花，果実などの形態で，オオバヌスビトハギにも近いことを明らかにした．